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Innovations

The Broad Institute—Six Years Later

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"In June 2003, the scientific and medical communities at MIT, Harvard University and its affiliated hospitals, and the Whitehead Institute banded together as collaborating partners to form the Eli and Edythe L. Broad Institute based in Cambridge, MA. The Broad Institute, established with initial funding from a $100 million philanthropic donation from the Los Angeles-based Broad family, was primarily viewed as a marriage between the Whitehead Institute's Center for Genome Research (WICGR) and the Harvard Institute of Chemistry and Cell Biology (ICCB). Eli Broad, founder and chairman of AIG SunAmerica, Inc., explained "the purpose of the Broad Institute is to create a new type of research institute to build on the accomplishments of the human genome project and to move to clinical applications to both prevent and cure diseases."

Every Thursday morning we meet with perhaps 20 faculty members and 100 other researchers to discuss what we're all doing and should be doing next. -David Altschuler

This paragraph was written five years ago when the Broad Institute was in its very earliest days as a life science research community (McCarthy, 2005). Since that time, "the Broad," as it's known, has kept true to Eli Broad's vision, having attracted a talented group of researchers, faculty, trainees, and professional staff. This 1,600 person research community, known internally as "Broadies," includes faculty, staff, and students from throughout the MIT and Harvard biomedical research communities and beyond, with collaborations spanning over a hundred private and public institutions in more than 40 countries worldwide.

"What is special about the Broad is that we have people from Harvard, MIT, and the Harvard hospitals come together and work on problems of shared interest that could not be solved in their own individuals labs," explains David Altshuler, M.D., Ph.D., Deputy Director and one of the Broad's six core faculty members. "These problems require expertise beyond any one principal investigator and infrastructure that may not be available elsewhere."

The Broad Institute was created to provide a place for multidisciplinary, multiinstitutional research around areas of biology, medicine, and genomics. "The Broad is committed to solving important problems in biology and medicine, enabling the next generation of scientists from any relevant discipline," says Altshuler. It attracts a consortium of researchers involved in mathematics, computation, biochemistry, and engineering, as well as chemistry and biology.

"What I find most exciting and interesting about the place is that I spend time talking and collaborating with faculty and scientists from other disciplines," says Altshuler. "It is constantly challenging to talk across disciplines. It is one of the things that make the science at the Broad so diverse and interesting. None of us can master all of the disciplines, but being cheek-to-jowl with someone with a shared purpose but different skill set brings us together to solve a problem of interest."

Genomics Roots and Branches

The Broad Institute is home to a significant portion of the talent surrounding the Human Genome Project, thanks to Eric Lander's presence as the Institute's Director. The former head of the Whitehead Institute/MIT Center for Genome Research, Lander was appointed by President Barack Obama to cochair the President's Council of Advisors on Science and Technology. As one of the principal leaders of the Human Genome Project, Lander and colleagues at the Broad Institute explore the molecular mechanisms underlying the basis of human disease.

The Broad seeks to use its mix of disciplines to tackle questions in fundamental biology, disease pathogenesis, and disease diagnosis and treatment. Joining Altshuler and Lander are four other core faculty members dedicated to this goal. Todd Golub (Dana-Farber Cancer Institute) and Stuart Schreiber (Harvard University and Howard Hughes Medical Institute) were two of the founding faculty in 2004. Since then, Deborah Hung, a chemical biologist and infectious disease physician, and Aviv Regev, a computational biologist, have joined the core faculty team.

"I think the people at the Broad Institute are having a major impact," says Michael Snyder, Director, Stanford Center for Genomics and Personalized Medicine. "Especially on the genomics side, they have clearly established themselves as leaders in human genome sequencing and analysis and applying it to human disease. I think they are certainly one of the best places in the world for that."

Snyder adds that part of the success of the genomics work at the Broad is larger than any one research institution, however talented. "The field of genomics has been exploding over the last five years," he says. "Applying genomics to medicine is the future in my mind, and the people at the Broad Institute recognize that and have been terrific about implementing genomics advances to important problems."

Notwithstanding its genomics success, much of the Broad's growth has been in other areas. particularly chemistry and chemical biology. For example. the Broad Institute Probe Development Center, a site of the NIH Molecular Libraries Probe Production Center Network, engages in over 25 small molecule probe development projects annually.

Rapid and Sustained Growth

Since its launch in May 2004, when it was founded as a 10 year experiment, the

Broad Institute is now an endowed corporation intended to persist indefinitely. "When we set it up, it was not clear if other people would show up," recalls Altshuler. But 60 associate members signed on at launch. Two years later, that number increased to 100 and now totals 156 associates, all of whom maintain their primary research efforts elsewhere and come together for a particular project or research program.

Today, the Broad Institute supports research into nine programs (up from a starting four), including the Medical and Population Genetics program directed by Altshuler. "It is a fascinating research environment," he says. "Every Thursday morning we meet with perhaps 20 faculty members and 100 other researchers to discuss what we're all doing and should be doing next." Research programs vary from Lander's Genome Biology Program to the Psychiatric Disease program.

Along with core research programs, the Broad supports eight research platforms that serve to further the goals of the programs. They are professional organizations that bring together scientific, technological, informatic, and management expertise to create unmatched technological capabilities for undertaking Broad projects. Examples include the RNAi platform, the Genome Sequencing platform, and the Metabolite Profiling Initiative. Platform creation is driven by a joint assessment of the program teams. "It's a messy organic process," Altshuler explains. "We identify something we wish we could do, a scientific problem that needs addressing, and we jointly figure out how to make it possible." He explains that this type of dialog is especially fruitful in furthering its famed genomics research.

Research teams also form around particular themed projects, such as the International Haplotype Map Project. There are at least 20 large-scale, single-focus projects currently ongoing including those in diabetes and cancer genetics.

Governance and Funding

Until July 2009, the Institute was managed by MIT. But the Institute is now a 501(c)(3) corporation similar to Massachusetts General Hospital, the Whitehead Institute, and Dana-Farber Cancer Institute, and is no longer managed by MIT. What is often misunderstood about the Broad's organization is that the governance bodies and faculty remain employees of their home institutions, not the Institute. To be a faculty member of the Broad, a faculty position at Harvard, MIT, or a Harvard hospital is required. Currently, the Broad has over 150 engaged faculty members from Harvard and MIT.

The initial $100 million funding from the Broads increased to $200 million and then again to $600 million in 2008. But the vast majority of the Broad's current $200 million annual budget derives from the researchers themselves. "Our faculty and researchers write grants to fund almost all of the work we do," explains Altshuler. Only $20 million of the Broad Institute's annual budget is funded by the annual Broad gift. "The scientists therefore drive what happens at the Broad because they write the grants. That also means we have the quality control of peer review," adds Altshuler, who comments that having outside colleagues scrutinize their work is essential to maintaining the Broad's intended high level of science.

"You must give credit to Eric Lander and the rest of the people at the Broad," says Snyder. "They have very good people there and they have been able to secure a lot of resources that have let them do extremely well."

Public Outreach

Unusually for a research institute of its scientific depth, the Broad Institute is dedicated to sharing discoveries made in the area of genomic research not only with fellow scientists but also to all people interested in its implications. "Through a variety of outreach activities, public programs, and events, we invite others to learn more about the genomic revolution and what it means for them," explains Nicole Davis, Ph.D., Director of External Communications. The Institute hosts efforts addressed to high school students interested in science and to underrepresented minorities pursuing scientific careers. Indeed, the lobby of the Institute's main research site hosts an interactive array of exhibits all focused on the advances made in genomics research. Passersby can even stop for a moment or two and press on touch screens launching a multilayer, mini instructional on topics related to the ongoing work inside.

Looking Forward

The Broad Institute has grown a lot in 6 years. "But we have to aspire and maintain the scientific culture and community—what has made the place exciting and nimble and open to new ideas," explains Altshuler. "This is a challenge that the Broad leadership thinks a lot about. We want to remain flexible. We have a great opportunity to do that. It's a place full of young people, energy, and dedication—the essence of any great environment."

REFERENCE

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